

AMENDMENTS TO THE CLAIMS

Listing of Claims

Please amend the claims as follows:

1. (Currently Amended) A nitrogen oxide removal equipment for removing nitrogen oxide contained in gas, comprising:
a nitrogen oxide absorption means provided with an absorption unit for removing nitrogen oxide contained in said gas by passing said gas through a solid absorbent layers,
said absorption unit comprising:

an absorbent storage part surrounded by a boundary wall of a storage part, a bottom panel of a storage part, and an upper portion of an outlet side, and provided with said solid absorbent layers therein; and

a plurality of low-profile unit ~~body~~ bodies being placed vertically and adjacently and
being provided with a gas rectification part ~~for rectifying gas passing in which gas is caused to~~
pass through said solid absorbent layers, and

said unit body comprising:

an intake side surface;

an outlet side surface disposed opposite to said intake side surface and provided with said upper portion of said outlet side and a lower portion of an outlet side;

said storage part boundary wall disposed between said intake side surface and said outlet side surface;

said bottom panel of said storage part disposed horizontally from a lower end of said boundary wall of said storage part to said upper portion of said outlet side;

a bottom of said rectification part disposed below a boundary of an outlet side, ~~i.e.,~~ said boundary including a boundary between said upper portion of said outlet side and said lower portion of said outlet side;

a bottom panel of said intake side extending from said intake side surface to said bottom of said rectification part; and

a bottom panel of said outlet side extending from said boundary of said outlet side to said bottom of said rectification part;

wherein a ratio of A:B is in a range of 1:1 to 1:10, where A represents a distance from a boundary defined by said bottom of said rectification part and said bottom panel extending to said outlet side to said bottom panel of said storage part while B represents a distance from said boundary to said outlet side surface, said boundary being placed near to said intake side surface while said bottom of said rectification part extending so as to be aligned to said boundary wall of said storage part of another unit body at said intake side.

2. (Currently Amended) The nitrogen oxide removal equipment according to claim 1, wherein said intake side surface is provided with an upper portion of an input side and a lower portion of an input side;

said bottom of said rectification part is disposed below a boundary of an intake side, ~~i.e.,~~ said boundary containing a boundary between said upper portion of said intake side and said lower portion of said intake side; and

said bottom panel of said intake side extends from said boundary of said intake side to said bottom of said rectification part.

3. (Currently Amended) The nitrogen oxide removal equipment according to claim 2, wherein said nitrogen oxide absorption ~~means~~ unit is formed by integrally laminating a plurality of absorption units in a vertical direction; said unit body is separated from said rectification part by said bottom of said rectification part, said bottom panel of said intake side and said bottom panel of said outlet side, and provided with a rectification part for a lower-stage unit to be said gas rectification part of another absorption unit disposed below when said absorption units are laminated; a gas intake to said rectification part for a lower-stage unit is provided on said lower portion of said intake side; and a gas outlet from said rectification part for a lower-stage unit is provided on said lower portion of said outlet side.

4. (Previously Presented) The nitrogen oxide removal equipment according to claim 1, wherein an angle θ between said bottom panel of said intake side and said upper portion of said intake side is in a range of 90 to 180 degrees.

5. (Canceled)

6. (Currently Amended) The nitrogen oxide removal equipment according to claim 1, wherein said bottom of said rectification part is ~~overlapped with~~ adjacent to said boundary wall of said storage part in a plane.

7. (Previously Presented) The nitrogen oxide removal equipment according to claim 1, wherein when said absorption units are laminated, said bottom of said rectification part disposed above is overlapped with an upper end of said boundary wall of said storage part of said absorption unit disposed below.

8. (Previously Presented) The nitrogen oxide removal equipment according to claim 1, wherein in case that a removal function of said solid absorbent layer is deteriorated, a regenerant supply means is provided to supply a regenerant to said nitrogen oxide absorption means so that nitrogen oxide absorbed in said solid absorbent layer is removed by said regenerant, thereby regenerating said deteriorated removal function.

9. (Previously Presented) The nitrogen oxide removal equipment according to claim 1, wherein said absorbent storage part and said gas rectification part have water-tightness.

10. (Previously Presented) The nitrogen oxide removal equipment according to claim 8, wherein said regenerant supply means is capable of individually supplying said regenerant to each of said absorption units.

11. (Previously Presented) The nitrogen oxide removal equipment according to claim 8, wherein said regenerant contains a sulfur-containing compound selected from the group consisting of alkali metal hydroxide, alkali earth metal hydroxide, lithium sulfite, sodium sulfite, potassium sulfite, calcium sulfite, magnesium sulfite, iron sulfite, copper sulfite, lithium

thiosulfate, sodium thiosulfate, potassium thiosulfate, calcium thiosulfate, magnesium thiosulfate, and a mixture thereof.

12. (Currently Amended) The nitrogen oxide removal equipment for removing nitrogen oxide contained in gas comprising:

absorption units provided with said plurality of low-profile solid absorbent layers constituting a nitrogen oxide absorption means; and

a gas rectification means ~~for supplying that supplies~~ said gas to a large-area side of said low-profile solid absorbent layers each provided with unit bodies in of said absorption unit, said unit bodies being placed vertically and adjacently; wherein said unit body comprises:

an intake side surface;

an outlet side surface disposed opposite to said intake side surface and provided with an upper portion of said outlet side and a lower portion of an outlet side;

said storage part boundary wall disposed between said intake side surface and said outlet side surface;

said bottom panel of said storage part disposed horizontally from a lower end of said boundary wall of said storage part to said upper portion of said outlet side;

a bottom of said rectification part disposed below a boundary of an outlet side, said boundary containing a boundary between said upper portion of said outlet side and said lower portion of said outlet side;

a bottom panel of an intake side extending from said intake side surface to said bottom of said rectification part; and

a bottom panel of said outlet side extending from said boundary of said outlet side to said bottom of said rectification part, wherein a ratio of A : B is in a range of 1 : 1 to 1 : 10, where A represents a distance from a boundary defined by said bottom of said rectification part and said bottom panel extending to said outlet side to said bottom panel of said storage part while B represents a distance from said boundary to said outlet side surface, said boundary being positioned near to said intake side surface while said bottom of said rectification part extending so as to be aligned to said boundary wall of said storage part of another unit body at said intake side.

13. (Canceled)

14. (Currently Amended) The nitrogen oxide removal method for removing nitrogen oxide contained in gas, comprising:

a removal step of removing nitrogen oxide contained in said gas by supplying said gas to a nitrogen oxide absorption means ~~means~~ containing unit that contains a low-profile solid absorbents for ~~absorbing and removing that absorbs and removes~~ nitrogen oxide via a gas rectification means for ~~that~~ selectively supplying supplies said gas to a large-area side of said low-profile solid absorbents disposed in a unit body, said nitrogen oxide absorption unit comprises a plurality of said unit bodies, said unit bodies being placed vertically and adjacently; and

a regeneration step of regenerating said nitrogen oxide removal function of said nitrogen oxide absorption ~~means~~ unit, which is deteriorated in said removal step, by removing nitrogen oxide absorbed in said solid absorbents by a regenerant containing a basic or a reducing substance,

wherein said unit body comprises:

an intake side surface;

an outlet side surface disposed opposite to said intake side surface and provided with an upper portion of said outlet side and a lower portion of an outlet side;

said storage part boundary wall disposed between said intake side surface and said outlet side surface;

said bottom panel of said storage part disposed horizontally from a lower end of said boundary wall of said storage part to said upper portion of said outlet side;

a bottom of said rectification part disposed below a boundary of an outlet side, said boundary containing a boundary between said upper portion of said outlet side and said lower portion of said outlet side;

a bottom panel of an intake side extending from said intake side surface to said bottom of said rectification part; and

a bottom panel of said outlet side extending from said boundary of said outlet side to said bottom of said rectification part,

wherein a ratio of A : B is in a range of 1: 1 to 1: 10, where A represents a distance from a boundary defined by said bottom of said rectification part and said bottom panel extending to said outlet side to said bottom panel of said storage part while B represents a distance from said boundary to said outlet side surface, said boundary being positioned near to said intake side surface while said bottom of said rectification part extending so as to be aligned to said boundary wall of said storage part of another unit body at said intake side.

15. (Original) The nitrogen oxide removal method according to claim 14, comprising:

a detection step of detecting said removal function by a nitrogen oxide sensor, wherein when deterioration of said removal function is detected in said detection step, said regeneration step is executed.

16. (Currently Amended) The nitrogen oxide removal method according to claim 14, wherein said regenerant is circulated between said nitrogen oxide absorption equipment and a regenerant tank ~~for storing~~ that stores said regenerant.

17. (Previously Presented) The nitrogen oxide removal method according to claim 14, comprising:

a preprocessing step for turning nitrogen oxide contained in said gas into nitrogen dioxide, dinitrogen trioxide, dinitrogen quadroxide or dinitrogen quintoxide.

18. (Previously Presented) The nitrogen oxide removal method according to claim 14, wherein said gas is air collected in a tunnel of a road, a canal/an underpath, a shelter of a road, a parking area, nearby a road, or at a bus stop.

19. (Original) The nitrogen oxide removal method according to claim 18, wherein said basic substance is alkali metal hydroxide or alkali earth metal hydroxide, and said reducing substance is a sulfur-containing compound selected from the group consisting of sodium sulfite, potassium sulfite, calcium sulfite, magnesium sulfite, iron sulfite, copper sulfite, lithium thiosulfate, sodium thiosulfate, potassium thiosulfate, calcium thiosulfate, magnesium thiosulfate, and a mixture thereof.

20. (Original) The nitrogen oxide removal method according to claim 19, wherein when said regenerant contains a reducing substance, said removal function is regenerated in a nitrogen atmosphere.

21. (Currently Amended) The nitrogen oxide removal equipment for removing nitrogen oxide contained in gas, comprising:

a nitrogen oxide absorption ~~means for absorbing~~ unit that absorbs nitrogen oxide containing low-profile solid absorbents ~~for absorbing and removing that absorb and remove~~ nitrogen oxide disposed in a unity body, said nitrogen oxide absorption unit comprises a plurality of unity bodies, said unity bodies being placed vertically and adjacently;

a gas rectification means ~~for selectively supplying said gas to~~ in selective fluid communication with a large-area side of said low-profile solid absorbents;

a regenerant supply ~~means for such that~~, when a nitrogen oxide removal function of said nitrogen oxide absorption ~~means~~ unit is deteriorated, ~~supplying~~ a regenerant containing a basic or reducing substance is supplied to said nitrogen oxide absorption ~~means~~ unit, wherein

said deteriorated removal function is regenerated by removing nitrogen oxide absorbed in said solid absorbents by said regenerant, and

said unity body comprising:

an intake side surface;

an outlet side surface disposed opposite to said intake side surface and provided with an upper portion of said outlet side and a lower portion of an outlet side;

said storage part boundary wall disposed between said intake side surface and said outlet side surface;

said bottom panel of said storage part disposed horizontally from a lower end of said boundary wall of said storage part to said upper portion of said outlet side;

a bottom of said rectification part disposed below a boundary of an outlet side, said boundary containing, a boundary between said upper portion of said outlet side and said lower portion of said outlet side;

a bottom panel of said intake side extending from said intake side surface to said bottom of said rectification part; and

a bottom panel of said outlet side extending from said boundary of said outlet side to said bottom of said rectification part,

wherein a ratio of A : B is in a range of 1 : 1 to 1 : 10, where A represents a distance from a boundary defined by said bottom of said rectification part and said bottom panel extending to said outlet side to said bottom panel of said storage part while B represents a distance from said boundary to said outlet side surface, said boundary being positioned near to said intake side surface while said bottom of said rectification part extending so as to be aligned to said boundary wall of said storage part of another unit body at said intake side.

22. (Currently Amended) The nitrogen oxide removal equipment according to claim 21, comprising:

a nitrogen oxide sensor ~~for detecting~~ that detects said removal function, wherein when said nitrogen oxide sensor detects nitrogen oxide of a predetermined concentration or higher, said removal function is regenerated.

23. (Currently Amended) The nitrogen oxide removal equipment according to claim 21, comprising:

a regenerant tank ~~for storing~~ that stores said regenerant, wherein said regenerant is capable of being circulated between said regenerant tank and said nitrogen oxide absorption equipment.

24. (Currently Amended) The nitrogen oxide removal equipment according to claim 21, comprising:

a preprocessing means ~~for turning in which~~ in which nitrogen oxide contained in said gas is caused to turn into nitrogen dioxide, dinitrogen trioxide, dinitrogen quadroxide or dinitrogen quitoxide, wherein said gas after passing through said preprocessing means is supplied to said nitrogen oxide absorption equipment.

25. (Currently Amended) The nitrogen oxide removal equipment for removing nitrogen oxide contained in gas, comprising:

a plurality of absorption units ~~for removing~~ that remove said nitrogen oxide contained in said gas by passing said gas through low-profile solid absorbent layers via a rectification means ~~for introducing~~ that introduces said gas into a large-area side of said low-profile solid absorbent layers, said absorption units are provided with a plurality of space-saving-type nitrogen oxide absorption means laminated and integrated in a direction intersecting an extension direction of said solid absorbent layers.

26. (Currently Amended) The nitrogen oxide removal equipment according to claim 25, wherein each of said absorption units is provided with a control means ~~for controlling that~~ controls a flowing rate of said gas passing through said solid absorbent layers.

27. (Currently Amended) The nitrogen oxide removal equipment according to claim 25, comprising:

a regenerant supply means ~~for that supplies regenerant to said nitrogen oxide absorption means~~ when a removal function of said solid absorbent layer is deteriorated, supplying regenerant to said nitrogen oxide absorption mean, wherein nitrogen oxide absorbed in said solid absorbent layer is removed by said regenerant, thereby regenerating said deteriorated removal function.

28. (Original) The nitrogen oxide removal equipment according to claim 27, wherein said regenerant supply means is capable of individually supplying said regenerant to each of said absorption units.

29. (Currently Amended) The nitrogen oxide removal equipment according to claim 25, comprising:

a preprocessing means ~~for turning in which~~ nitrogen oxide contained in said gas is caused to turn into nitrogen dioxide, dinitrogen trioxide, dinitrogen quadroxide or dinitrogen quintoxide.

30. (Currently Amended) The nitrogen oxide removal equipment according to claim 25 27, wherein said regenerant is a sulfur-containing compound selected from the group consisting

of alkali metal hydroxide, alkali earth metal hydroxide, lithium sulfite, sodium sulfite, potassium sulfite, calcium sulfite, magnesium sulfite, iron sulfite, copper sulfite, lithium thiosulfate, sodium thiosulfate, potassium thiosulfate, calcium thiosulfate, magnesium thiosulfate, and a mixture thereof.

31. (Currently Amended) The nitrogen oxide removal equipment for removing nitrogen oxide contained in gas, comprising:

~~a humidifying means for humidifying said gas~~ humidifier; and

a nitrogen oxide absorption means ~~for removing that removes~~ said nitrogen oxide contained in said gas by passing said gas through low-profile solid absorbent layers via a rectification means ~~for introducing that introduces~~ said gas into a large-area side of said low-profile solid absorbent layers, disposed in a unit body, said nitrogen oxide absorption means comprising a plurality of said unit bodies, said unit bodies being placed vertically and adjacently, and said unit body comprising:

an intake side surface;

an outlet side surface disposed opposite to said intake side surface and provided with an upper portion of said outlet side and a lower portion of an outlet side;

said storage part boundary wall disposed between said intake side surface and said outlet side surface;

said bottom panel of said storage part disposed horizontally from a lower end of said boundary wall of said storage part to said upper portion of said outlet said;

a bottom of said rectification part disposed below a boundary of an outlet side, said boundary including, a boundary between said upper portion of said outlet side and said lower portion of said outlet side;

a bottom panel of intake side extending from said intake side surface to said bottom of said rectification part; and

a bottom panel of said outlet side extending from said boundary of said outlet side to said bottom of said rectification part, wherein a ratio of A : B is in a range of 1 : 1 to 1 : 10, where A represents a distance from a boundary defined by said bottom of said rectification part and said bottom panel extending to said outlet side to said bottom panel of said storage part while B represents a distance from said boundary to said outlet side surface, said boundary being positioned near to said intake side surface while said bottom of said rectification part extending so as to be aligned to said boundary wall of said storage part of another unit body at said intake side; and

wherein said ~~humidifying means~~ humidifier is integrated with said nitrogen oxide absorption means so as to overlap with said solid absorbent layers in a plane, and said gas after passing through said ~~humidifying means~~ humidifier is supplied to said nitrogen oxide absorption equipment.

32. (Currently Amended) A nitrogen oxide removal equipment according to claim 31, comprising:

a water tank ~~for storing that stores~~ humidifying water used by said ~~humidifying means~~ humidifier, wherein

when a ~~regenrant~~ regenerant is supplied onto said solid absorbent layers, said regenerant after passing through said solid absorbent layers is supplied to said water tank, said solid absorbent layer is formed by solid absorbents containing a carbon material; and said regenerant is a sulfur-containing compound selected from the group consisting of alkali metal hydroxide, alkali earth metal hydroxide, lithium sulfite, sodium sulfite, potassium sulfite, calcium sulfite, magnesium sulfite, iron sulfite, copper sulfite, lithium thiosulfate, sodium thiosulfate, potassium thiosulfate, calcium thiosulfate, magnesium thiosulfate, and a mixture thereof.